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CLAIMS:

1. A biological media structure comprising:

an ultra-disperse nano-particle of a hydrated oxide;

a biological tissue; and

surrounding media,

said structured biological media comprising a three-sided biological system.

2. The structure of claim 1 wherein said particle has a substantially spherical shape.

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3. The structure of claim 1 wherein said particle has selective electrical attraction to areas of charge anomaly on said biological tissue surface, so as to coat said areas by providing said stable three-sided biological systems preventing toxin penetration through said tissue surface.

4. The structure of claim 1 wherein said particle has selective electrical attraction to bacterial surfaces, so as to coat said surfaces by providing stable three-sided biological systems preventing bacterial activity including ion or other exchange through the membrane.

5. The structure of claim 1 wherein said particle is provided in a powdered form. not further improper dependency

6. The structure of claim 5 wherein said particle is provided pressed into a pill with an anti-aggregation component for dispersal of said powder upon digestion. antecedent base

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7. The structure of claim 1 wherein said particle is provided in a porous bag for submersion in water, said porous bag preventing escape of said particles when dry so as to prevent inhalation of said particles.

8. The structure of claim 1 wherein said particle is provided in a capsule with dissolvable walls for use in at least one of swallowing and dissolving in water.

9. The structure of claim 1 wherein said particle has a modified surface structure.

10. The structure of claim 9 wherein said particle surface has hydroxyl groups having undergone partial methylation, providing a particle with a surface having methylated sites, said particle surface being partially hydrophobic and partially hydrophilic.

11. The structure of claim 10 wherein said particle produces an IR spectrum with a peak at 3750 nm showing percentage hydrophilicity and a peak at 2980 nm showing percentage hydrophobicity.

12. The structure of claim 1 wherein said particle is provided in a mechanical mixture of hydrophobic and hydrophilic particles, producing an IR spectrum with a peak at 3750 nm showing percentage of hydrophilic particles and a peak at 2980 nm showing percentage of hydrophobic particles.

13. The structure of claim 10 wherein said particle is provided with approximately 10%-90% hydrophobic surface groups, resulting, conversely in approximately 90%-10% hydrophilic surface groups.

14. The structure of claim 10 wherein said particle is provided with an electrical potential affecting ion channels in said biological tissue.

15. The structure of claim 14 wherein a plurality of said particles form a helical structure.

16. The structure of claim 10 wherein said particle provides a stable thixotropic water-oil emulsion.

17. The emulsion of claim 16 further aerated to provide a water-oil-gas emulsion.

18. The structure of claim 10 wherein said particle is etched with interconnected interior channels etched into it causing extremely high surface area per unit solid mass.

19. The structure of claim 18 wherein said particle surface has a ratio of hydrophilic to hydrophobic surface groups between approximately 0.1 to 0.3.

20. The structure of claim 18 wherein said particle interconnected interior channels are filled with a component for slow release into said three-sided system.

21. The structure of claim 18 wherein said particle interconnected interior channels are further etched causing said particle to disintegrate into even smaller nano-particles of under approximately 10 nm in size.

22. The structure of claim 21 wherein said particle in said smaller nano-particles are provided with a hydrophilic to hydrophobic surface group ratio of between approximately 0.4 to 0.8.

23. The structure of claim 10 wherein said remaining hydroxyl groups on said particle surface are further modified so as to control at least one of surface charge, pH and electrical potential.

24. The structure of claim 23 wherein said further modifications are provided as protrusions from said particle surface.

25. The structure of claim 24 wherein said particle protrusions are composed of the same chemical composition as said particle.

26. The structure of claim 24 wherein said particle protrusions are composed of a different chemical composition than said particle.

27. The structure of claim 24 wherein said particle protrusions are composed of at least one of metals, nonmetals, macromolecules, antibiotics, vitamins, microelements, and organic material.

28. The structure of claim 24 wherein said particle protrusions are branched in shape.

29. The structure of claim 28 wherein said particle protrusions have multiple branching sites.

30. The structure of claim 28 wherein said branched particle protrusions are composed of the same chemical composition as said particle.

31. The structure of claim 28 wherein said branched particle protrusions are composed of a different chemical composition than said particle.

32. The structure of claim 31 wherein said particle protrusions are composed of multiple chemical compositions, each composition layered sequentially on a protrusion formed previously.

33. The structure of claim 32 wherein said particle provides a three-dimensional electrical charge spatial template in said media, as determined by said multiple chemical compositions.

34. The structure of claim 24 wherein said particle protrusions are attached to said particle by a low bonding force such that said protrusions can be detached upon treatment by at least one of exposure to high intensity ultrasound waves and insertion into liquid.

35. The structure of claim 34 wherein said detachable particle protrusions create nano-particles of under approximately 10 nm in size.

36. The structure of claim 34 wherein said detachable particle protrusions form an electrostatic interaction.

37. The structure of claim 24 wherein said methylated sites of said particle are demethylated and a second set of protrusions of an opposite charge from the first set of protrusions is added, so as to form a particle with two sets of protrusions of opposite charges.

38. The structure of claim 1 wherein said particle has acquired a charge through a double electric layer so as to be capable of electrostatic interaction with regions of a third component.

39. The structure of claim 1 wherein said particle is capable of charge reversal according to the pH of the environment.

40. The structure of claim 1 wherein said particle is used for directed action on microorganisms of different types.

41. The structure of claim 1 wherein said particle is capable of interaction with at least one of affected cell regions or bacteria, while said particle retains high absorption capacity and selectivity.

42. The structure of claim 1 wherein said particle is capable of adsorbing the toxic substances formed as a result of vital activity and decomposition of a biosystem.

43. The structure of claim 1 wherein said particle is provided with dual action, such that any biological function caused by the presence of said particle is followed by a process of at least one of toxic result neutralization, absorption and destruction.

44. The structure of claim 1 wherein said particle is characterized by a broad interaction spectrum, from intermolecular to chemical, with at least one of the environment and the boundary of any system located in it.

45. The structure of claim 1 wherein said particle exhibits, on appearance of a third

component of said threc-sided biological system, active, self-organizing properties, thereby responding adequately and selectively to the appearance of said third component and to its charge state, thereby forming a localized stable three component system.

46. The structure of claim 1 wherein said particle exhibits selectivity of particle action depending on the size and shape of an object, on the charge, on the hydrophilic-hydrophobic pattern and on the availability of functional groups.

47. The structure of claim 1 wherein said particle enables structurization of the bioenvironment with formation of at least one of locally non-homogeneous regions and nano-size fluctuations, interacting through a network of three dimensional bonds containing an inorganic particle.

48. The structure of claim 1 wherein said particle forms said three-sided biological system in which said surrounding media comprises structured thixotropic biofluids, said system acting as an analog of membranes impeding the transport of bacteria, of their nutrients and of dissolved inorganic compounds and ions.

49. The structure of claim 48 wherein said particle forms a stable three-dimensional ? structure in a thixotropic environment when in contact with an inanimate component and forms an unstable structure which has variable thixotropy when in contact with a living component.

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50. The structure of claim 1 wherein said particle is provided with the capacity to be adsorptive and chemisorptive and to form chelates allowing inorganic and organic components to be isolated.

51. The structure of claim 50 wherein said particle has adsorptive capacity for interaction with hydrophobic-hydrophilic regions of bio-objects as well as for specific interaction with components of a living environment.

52. The structure of claim 1 wherein said particle is a combination of positively and negatively charged particles provided for encapsulation of bacteria.

53. The structure of claim 10 ~~wherein said particle has~~ said hydrophilic particles that are used to inactivate bacteria inside a block of structurized water, with practical disruption of the link between the bacteria and the environment.

54. The structure of claim 10 wherein said particle is used for and at least one of intermolecular interaction with hydrophobic regions of membranes, supply and removal of oils.

55. The structure of claim 10 wherein said particle is provided with a specific hydrophobic-hydrophilic balance on the surface permitting formation of a branched

three-dimensional network in a system of non-interactive hydrophobic-hydrophilic environments across the surface of a solid body.

56. The structure of claim 10 wherein said particle is provided with a given hydrophobic-hydrophilic balance on the surface causing chemical reactions over specific surface hydroxyl groups with metal chlorides, creating highly non-uniform heterogeneous environments with new thixotropic properties, different charges, different photochemical abilities and other changed properties.

57. The structure of claim 24 wherein said particle is formed with a series of layers of active ingredients which are encapsulated in slow-release covers.

58. The structure of claim 52 wherein said particle has active ingredients that are released in sequence and a final active ingredient absorbs the results of the reaction.

59. The structure of claim 24 wherein said particle protrusions form a “lock and key” system whereby an ionic channel is shut, encapsulating a microbe and shielding it from the environment.

60. The structure of claim 10 wherein said surface hydroxyl groups are replaced with at least one of inorganic radicals, and organic radicals including the group of amines, alcohols, iodine, and bromine, leading to formation of bonds of the donor acceptor type,

complexes with coordination type charge transfer, covalent bonds and dispersion interaction with the functional radicals of a bio-object.

61. The structure of claim 24 wherein said particle is provided in mechanical mixtures of said particles which are differently charged in the presence of water, depending on the pH of the environment, and therefore will interact differently with each other and with specific biomembrane regions.

62. The structure of claim 24 wherein said particle is subjected to mechanical mixing, followed by settling of substances with heterogeneous structures in an aqueous environment leading to formation of xerogels with an ultra-heterogeneous pore structure.

63. A method of modifying the surface of ultra-disperse nano-particles of hydrated oxides by partial methylation, said method comprising the steps of:

heat-treating said particles in an open vessel at an appropriate temperature so as to remove absorbed and bound structural water;

reacting said heat-treated particles with functional organic molecules in the gaseous phase at high temperature so as to methylate surface hydroxyl groups;

removing excess reagent and reaction products;

hydrolyzing unreacted chloride groups on said surface through heating in the presence of saturated water vapor;

heating finally in at least one of an open vessel and an inert atmosphere; and

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cooling,

such that said nano-particles become modified by partial methylation of their surface.

64. The method of claim 63 wherein the step of reacting said heat-treated particles is allowed to continue for between approximately 5 and 60 min at a temperature of approximately between 200-300 °C, the length of said exposure determining percentage of said methylation.

65. The method of claim 63 wherein the step of hydrolyzing is effected at a temperature of between approximately 250-300 °C for a period of approximately one hour.

66. The method of claim 63 wherein said final heating step is effected at a temperature of approximately between 200-300 °C.

67. The method of claim 63 further comprising the step of checking percent methylation by IR spectroscopy, said hydroxyl groups appearing at approximately 3750 nm and said methyl groups appearing at approximately 2980 nm.

68. The method of claim 63 further comprising the step of:

etching non-methylated surface sites so as to create interconnected interior channels providing said particles with high surface per unit mass.

69. The method of claim 63 further comprising the step of further modifying said partially methylated particles by building spike-like protrusions on said surface of said particles in areas which have not been methylated, by heat-treating in the presence of a desired component.

70. The method of claim 69 further comprising the step of monitoring control of growth of said protrusions by measuring the intensity of said hydroxyl group peak at 3750 nm through IR spectroscopy.

71. The method of claim 69 wherein said spike-like protrusions are comprised of at least one of SiO_2, Al_2O_3 and TiO_2.

72. The method of claim 69 wherein the step of heat-treating in the presence of SiO_2 takes place at a temperature of at least one of 200°C, 400°C and 650°C.

73. The method of claim 69 wherein the step of heat-treating in the presence of at least one of Al_2O_3 and TiO_2 takes place at a temperature of between approximately 200-400 °C.

74. The method of claim 69 further comprising the steps of:

heating said particles to between approximately 500-700 °C so as to demethylate said methylated areas of said particle surface, thereby also methylating said spike-like protrusions so as to form a protective cap; and

building a second type of protrusion on said demethylated areas, by heat treatment in the presence of a second component,

so that a second type of protrusion is formed on said demethylated areas.

75. The method of claim 74 further comprising the step of:

reiterating partial methylation of said particle so as to produce branched protrusions.

76. The method of claim 63 further comprising the steps of:

creating drops of approximately 50-100 microns with an ultrasound atomizer,

feeding said drops into a chamber with a layer of said hydrophobic particles such that said drops become coated by said particles due to collision forces; and

introducing said coated drops into an emulsion under turbulent mixing,

such that said hydrophobic particles will allow insertion into an oily medium, resulting in an emulsion with a high water content.

77. The method of claim 76 wherein said step of introducing said coated drops takes place in a gas enriched environment so as to create a water-oil-gas emulsion.

78. The method of claim 77 wherein said gas is at least one of air and ozone.

79. The structure of claim 10 wherein a combination of partially hydrophilic and hydrophobic particles are provided in a toothpaste.

80. The structure of claim 79 wherein said partially hydrophilic particles break the adhesive connection between the plaque and the enamel of the tooth.

81. The structure of claim 80 wherein said partially hydrophobic particles adsorb the plaque released by said partially hydrophilic particles.

82. The toothpaste of claim 79 further comprising particles with a negative electrical charge for treatment of inflamed gum tissue.

83. The hydrophobic particle of claim 79 further comprising flouride for direct delivery to the tooth enamel.

84. The toothpaste of claim 79 further comprising flouride.

85. The toothpaste of claim 79 wherein said partially hydrophilic and said partially hydrophobic particles comprise less than approximately 20% of the total weight of said toothpaste.

86. The structure of claim 10 wherein said particle is provided as a combination of hydrophilic and hydrophobic particles that are provided in a chewing gum for use as a dentrifice.

87. The structure of claim 10 wherein said particle is for use in medicinal applications.

88. The structure of claim 10 wherein said particle is for use in cosmetic applications.

89. The structure of claim 10 wherein said particle is for use in hygiene applications.

90. The structure of claim 10 wherein said particle is for use in the food industry.

91. The structure of claim 10 wherein said particle is for use in agricultural applications.

92. The structure of claim 10 wherein said particle is for use in water treatment applications.

93. The structure of claim 10 wherein said particle is for use in disinfection applications.